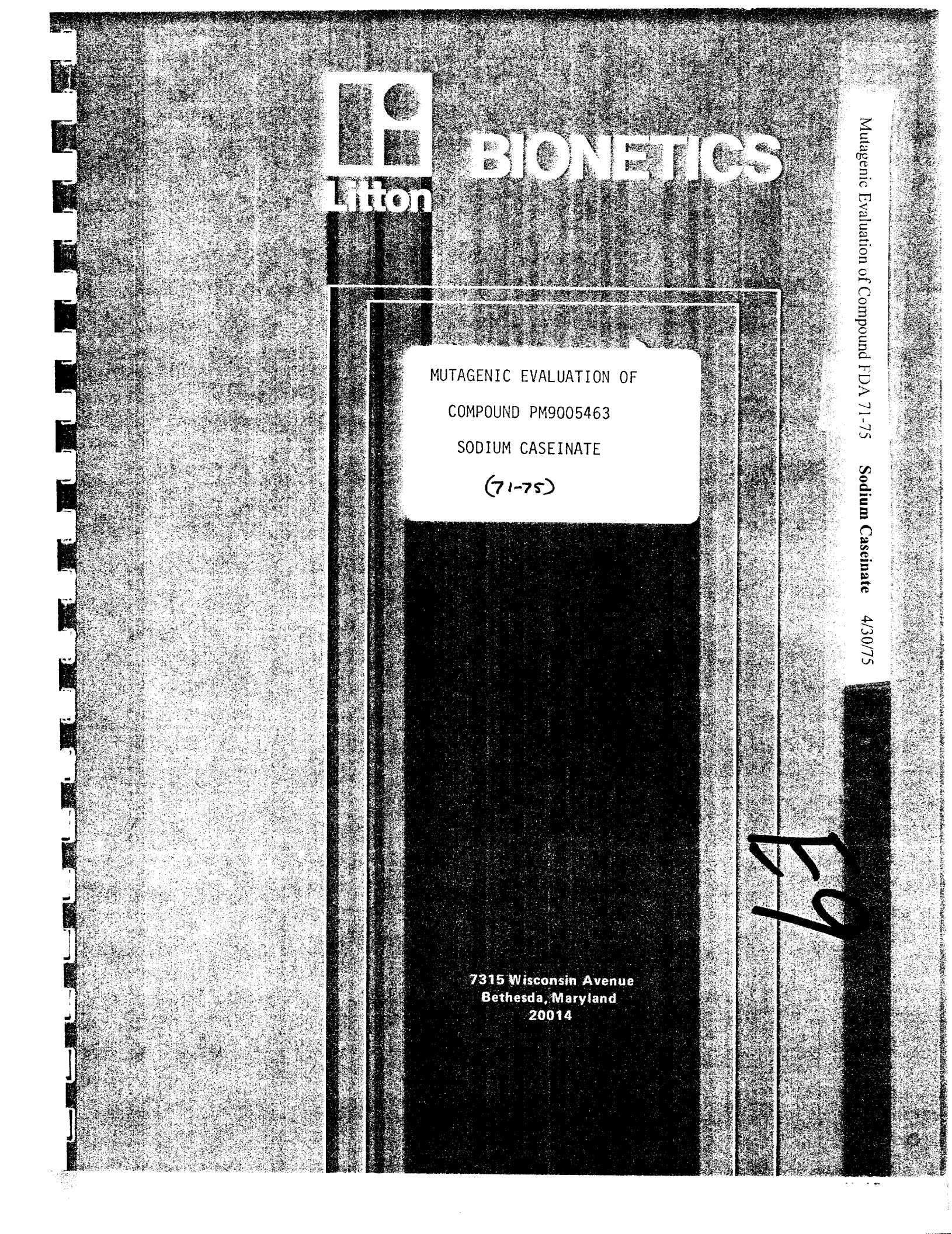
Litton
BIONETICS
MUTAGENIC EVALUATION OF
COMPOUND PM9005463
SODIUM CASEINATE
(71-75)
7315 Wisconsin Avenue
Bethesda, Maryland
20014
Mutagenic Evaluation of Compound FDA 71-75 Sodium Caseinate 4/30/75
69

LBI PROJECT #2468

MUTAGENIC EVALUATION OF

COMPOUND PM9005463

SODIUM CASEINATE

(71-75)

SUBMITTED TO

FOOD & DRUG ADMINISTRATION
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
ROCKVILLE, MARYLAND

SUBMITTED BY

LITTON BIONETICS, INC.
5516 NICHOLSON LANE
KENSINGTON, MARYLAND

APRIL 30, 1975

Litton BIONETICS

TABLE OF CONTENTS

EVALUATION SUMMARY

Compound PM9005463, Sodium Caseinate, did not exhibit genetic activity in any of the assays employed in this evaluation.

DATE: April 30, 1975

SPONSOR: Food and Drug Administration, Contract Number 223-74-2104

SUBJECT: Evaluation of Test Compound PM9005463, Sodium Caseinate

I. OBJECTIVE

The objective of this study was to evaluate the test compound for genetic activity in microbial assays with and without the addition of mammalian metabolic activation preparations.

II. MATERIALS

A. Test Compound

1. Date Received: August, 1974

2. Description: White, powder

B. Indicator Microorganisms

The following strains of indicator microorganisms were used in the evaluation:

Yeast Strain: Saccharomyces cerevisiae, strain D4

Bacteria Strains: Salmonella typhimurium, strains: TA-1535
TA-1537
TA-1538

C. Reaction Mixture

The following reaction mixture was employed in the activation tests:

Component	Final Concentration/ml	
1. TPN (sodium salt)	6	µM
2. Isocitric acid	49	µM
3. Tris buffer, pH 7.4	28	µM
4. $MgCl_2$	1.7	µM
5. Tissue homogenate fraction	72	mg

D. Tissue Homogenates and Supernatant

The tissue homogenates and 9,000 x g supernatants were prepared from tissues of the following mammalian species: Mouse-ICR random bred adult males; rat-Sprague-Dawley adult males; and primate-Macaca mulatta adult males.

E. Positive Control Compounds

Table 1 lists chemicals for positive controls in the direct and activation assays.

TABLE 1

POSITIVE CONTROLS USED IN DIRECT AND ACTIVATION ASSAYS

Assay	Chemical[a]	Solvent	Probable Mutagenic Specificity
Non-activation	Ethyl methanesulfonate	Water or saline	BPS
	2-Nitrofluorene	Dimethylsulfoxide[c]	FS
	Quinacrine mustard	Water or saline	FS
Activation	Dimethylnitrosamine	Water or saline	BPS
	2-Acetylaminofluorene	Dimethylsulfoxide[c]	FS

[a] Concentrations given in the Results Section
[b] BPS = base-pair substitution; FS = frameshift
[c] Previously shown to be non-mutagenic

III. METHODS

A. Toxicity

The solubility, toxicity and doses for all chemicals were determined prior to screening.

Each chemical was tested for survival against the specific indicator strains over a range of doses to determine the 50% survival dose. Bacteria were tested in phosphate buffer, pH 7.4, for one hour at 37°C on a shaker. Yeasts were tested in phosphate buffer, pH 7.4, for four hours at 30°C on a shaker. The 50% survival curve and the 1/4 and 1/2 50% doses calculated.

If no toxicity was obtained for a chemical with a given strain, then a maximum dose of 5% (w/v) was used against the strain.

Unless otherwise specified, the doses calculated for the tests in buffer were applied to the activation tests. The solubility of the test chemical under treatment conditions is stated in the Results Section.

B. Plate Tests

In the nonactivation procedure, approximately 10^9 cells of a log-phase culture of the bacterial indicator strains were spread over the surface of a minimal plate, and a measured amount of the test chemical was placed in the center of the test plate. In activation tests, the test chemical was added to the cells, and an aliquot of the mixture was spread on the surface of the test plate. The reaction mixture (0.1 ml) plus tissue extract was then spotted on the surface of the plate. Positive and solvent controls were included. All plates were incubated at 37°C for four days and then scored. Each compound (test, positive control and solvent control) was done in duplicate. Concentrations of the positive control compounds are listed in the Results Section.

C. Suspension Tests

1. Non activation

Log-phase bacteria and stationary-phase yeast cultures of the indicator organisms were grown in complete broth, washed and resuspended in 0.9% saline to densities of 1×10^9 cells/ml and 5×10^7 cells/ml, respectively. This constituted the working stock for tests of a group of test chemicals and their respective controls. Tests were conducted in plastic tissue culture plates. Cells plus appropriate volume(s) of the test chemical were added to the wells to give a final volume of 1.5 ml. The solvent replaced the test chemical in the negative controls. Treatment was at 30°C for four hours for yeast tests and at 37°C for one hour for bacterial tests. All flasks were shaken during treatment. Following treatment, the plates were set on ice. Aliquots of cells were removed, diluted in sterile saline (4°C) and plated on the appropriate complete media. Undiluted samples from flasks containing the bacteria were plated on minimal selective medium in reversion experiments. Samples from a 10^{-1} dilution of treated cells were plated on the selected media for enumeration of gene conversion with strain D4. Bacterial plates were scored after incubation for 48 hours at 37°C. The yeast plates were incubated at 30°C for 3-5 days before scoring.

2. Activation

Bacteria and yeast cells were grown and prepared as described in the non activation tests. Measured amounts of the test and control chemicals plus 0.25 ml of the stock-cell suspension were added to wells of the Linbro plate containing the appropriate tissue fraction and reaction mixture. All flasks (bacteria and yeast) were incubated at 37°C in an oxygen atmosphere with shaking. The treatment times as well as the dilutions, plating procedures and scoring of the plates were the same as described for non activation tests.

D. Preparation of Tissue Homogenates and 9,000 x g Cell Fractions

Male animals (sufficient to provide the necessary quantities tissues) were killed by cranial blow, decapitated and bled. Organs were immediately dissected from the animal using aseptic techniques and placed in ice-cold 0.25 M sucrose buffered with Tris at pH of 7.4. Upon collection of the desired quantity of organs, they were washed twice with fresh buffered sucrose and completely homogenized with a motor-driven homogenizing unit at 4°C. The whole organ homogenate obtained from this step was divided into two samples. One sample was frozen at -80°C and the other was centrifuged for 20 minutes at 9,000 x g in a refrigerated centrifuge. The supernatant from the centrifuged sample was retained and frozen at -80°C. These two frozen samples were used for the activation studies.

E. Data Recording and Reporting

Following the specified incubation periods all population plates were scored by an automatic colony counter and the results from each plate of a set were recorded, in ink, on data processing forms. All minimal or other types of selective media plates were hand scored and the results recorded along with the respective population data. Other relevant experimental data were recorded on experimental definition forms. For bacteria strains the number of colonies recorded from either the population or selective plates represents that number in 1 ml of test suspension plated. The numbers recorded for the yeast strain D4 represent the number in 0.5 ml of test suspension plated. Data was then processed and printed from a computer program.

IV. RESULTS SECTION

A. Solubility Properties of the Test Compound

1. Name or code designation of the test compound:
PM9005463, Sodium Caseinate

2. Test solvent: DMSO

3. Solubility of the test compound under treatment conditions:
Insoluble under treatment conditions.

4. Additional comments: White powder

B. Toxicity and Dosage Determinations for the Test Compound

1. Test date for toxicity determination: November 13, 1974

2. The 50% survival level was determined for bacteria and yeast indicator organisms by conducting survival curves with the test compound at the following concentrations:

Percent Concentration (w/v or v/v)

5.0
0.5
0.05
0.005
0.0005

3. Concentrations of the test compound used in the mutagenicity tests:

Dose	Percent Concentration	
	Bacteria	Yeast
1/4 50% Survival	1.13	1.25
1/2 50% Survival	2.25	2.50
50% Survival	4.50	5.00
Plate Tests	2.25	--

IV. SUMMARY OF TEST RESULTS

Plate Tests

A. Name or code designation of the test compound: PM9005463

B. Test date: April 23, 1975

C. Concentration of the test compound: 2.25%

Test	Species	Tissue	TA-1535		TA-1537		TA-1538	
			1	2	1	2	1	2
1. Non-activation								
Solvent Control	---	---	138	146	25	22	26	35
Positive Control[a]	---	---	$>10^4$	$>10^4$	193	176	158	219
Test Compound	---	---	179	162	19	19	38	58
2. Activation								
Negative Control	---	---	16	15	27	23	11	14
Solvent Control	---	---	12	9	36	43	17	18
Reaction Mixture Control	---	---	10	18	36	39	9	17
Positive Control[b]	Mouse	Liver	$>10^3$	$>10^3$	146	143	239	225
Positive Control		Lung	9	8	33	33	14	11
Positive Control		Testes	11	7	37	32	15	15
Positive Control	Rat	Liver	$>10^3$	$>10^2$	84	80	329	313
Positive Control		Lung	10	8	32	35	16	12
Positive Control		Testes	11	6	24	43	16	16
Positive Control	Monkey	Liver	$>10^3$	$>10^3$	47	43	122	129
Positive Control		Lung	7	9	32	38	15	10
Positive Control		Testes	9	5	28	33	15	15
Test Compound	Mouse	Liver	11	13	31	49	12	15
Test Compound		Lung	10	15	20	31	31	22
Test Compound		Testes	11	15	31	36	26	17
Test Compound	Rat	Liver	9	12	38	48	19	20
Test Compound		Lung	14	14	24	33	28	26
Test Compound		Testes	9	12	34	29	21	11
Test Compound	Monkey	Liver	9	12	42	49	11	25
Test Compound		Lung	10	15	21	30	25	21
Test Compound		Testes	10	10	28	32	18	15

a TA-1535 EMS 10 µl/plate
TA-1537 QM 20 µg/plate
TA-1538 NF 100 µg/plate

b TA-1535 DMNA 50 µm/plate
TA-1537 AAF 100 µg/plate
TA-1538 AAF 100 µg/plate

DATA TABLE TERMS AND ABBREVIATIONS

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
COMPOUND	Client designated compound number appears in this column.
TEST CODES	NAN = Non Activation: Solvent Control NAP = Non Activation: Positive Control NA1 = Non Activation: Test Compound Dose 1 NA2, etc. = Reflects the other dose level(s) A+C = Negative Chemical Control A-C = Activation: Solvent Control ACP = Activation: Positive Control ACT = Activation: Test Compound A+T = Activation: Tissue Control LI = Liver Tissue Activation Fraction LU = Lung Tissue Activation Fraction KI = Kidney Tissue Activation Fraction TE = Testes Tissue Activation Fraction 1,2, etc. = Dose Levels
CONCENTRATION	All test compound dose levels are expressed as a whole number followed by an exponent (negative) identified by the appropriate units. Example: 0025-2PCT = 0.25 percent concentration
POPU	Total number of viable cells in the plating sample raised to some exponent printed directly below the abbreviation (i.e., EP + 6 = X 10^6).
MUT 1	Total number of mutants or convertants obtained from the sample plated raised to some exponent printed directly below the abbreviation (i.e., EP + 0 = X 10^0). For strain D4, MUT 1 represents the number of ADE+ convertants.
MUT 2	Only used for strain D4 and represents the number of TRY+ convertants in the plated sample.
FREQ 1	The calculated mutation or gene conversion frequency times the negative exponent written directly below. For strain D4, FREQ 1 represents the ADE+ value.
FREQ 2	Only used for strain D4 and represents the TRY+ conversion frequency.
CONTAM	Presence of contamination on any plates.

DATA TABLE TERMS AND ABBREVIATIONS (continued)

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
AAF	2-Acetylaminofluorene
DMSO	Dimethylsulfoxide
DMN	Dimethylnitrosamine
EMS	Ethyl Methanesulfonate
QM	Quinacrine Mustard
NF	Nitrofluorene
SPECIES	Animal Strains
SPRDAW	Sprague Dawley Rats
ICRFLO	Flow ICR Random Bred Mice
RHESUS	Rhesus Monkey (Macaca mulatta)
MIXEDB	Dog, Mixed Breed
NEWZEA	New Zealand White Rabbit

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 04/25/75

SPECIES COMPOUND PM9005463

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
NAN		1.22	4.28	9.79	4.37	4.76
NAP		1088.21	415.68	181.23	160.96	60.50
NA1		3.00	3.44	6.22	2.89	3.95
NA2		0.76	4.83	5.02	2.94	3.03

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 04/25/75

SPECIES ICRFLO COMPOUND PM9005463

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	2.63	3.70	4.95	3.56	4.07
ACT	A-C	1.05	3.44	2.56	3.82	6.21
ACT	PLI	58.39	14.57	36.50	7.31	9.96
ACT	PLU	1.15	3.31	4.31	3.71	3.84
ACT	PTE	9.55	3.74	3.35	3.06	6.12
ACT	LI1	2.96	2.30	2.90	4.54	5.60
ACT	LI2	3.32	1.97	4.62	4.61	4.50
ACT	LU1	1.22	2.02	2.83	5.25	4.36
ACT	LU2	1.99	3.24	3.06	5.51	3.87
ACT	TE1	1.62	4.07	3.75	5.06	4.82
ACT	TE2	2.33	3.38	4.16	5.61	5.05

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 04/25/75

SPECIES SPRDAW COMPOUND PM9005463

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	3.12	10.83	10.78	2.69	2.22
ACT	A-C	4.26	8.33	5.64	4.67	3.00
ACT	PLI	49.05	18.14	129.82	6.49	4.25
ACT	PLU	2.70	5.39	15.38	4.51	4.26
ACT	PTE	3.52	12.52	6.04	2.91	4.07
ACT	LI1	2.97	10.04	10.92	3.70	5.59
ACT	LI2	5.86	10.00	5.69	3.76	3.92
ACT	LU1	3.54	7.18	6.98	4.83	4.70
ACT	LU2	1.55	8.32	4.17	4.10	4.44
ACT	TE1	2.34	7.67	5.87	5.62	1.94
ACT	TE2	2.69	6.78	4.35	2.54	2.85

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 04/25/75

SPECIES RHESUS COMPOUND PM9005463

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	5.36	5.04	15.13	5.59	4.93
ACT	A-C	8.28	3.26	4.81	5.31	6.15
ACT	PLI	197.63	14.44	49.46	5.89	6.26
ACT	PLU	15.17	2.95	4.60	3.75	5.23
ACT	PTE	5.03	5.26	5.69	4.84	3.49
ACT	LI1	3.99	4.54	9.47	3.57	6.84
ACT	LI2	6.91	2.82	5.06	1.36	3.06
ACT	LU1	2.27	3.24	2.18	3.64	4.44
ACT	LU2	5.70	3.16	2.42	2.18	6.42
ACT	TE1	3.38	9.19	2.63	2.51	2.40
ACT	TE2	8.38	3.50	3.05	2.56	1.19

V. INTERPRETATION OF RESULTS AND CONCLUSIONS

Compound PM9005463, Sodium Caseinate, was evaluated for genetic activity in a series of *in vitro* microbial assays with and without metabolic activation. The following results were obtained:

A. Salmonella typhimurium

1. Plate Tests

At a concentration of 2.25%, PM9005463 was not mutagenic for any of the bacterial indicator organisms in either direct or activation plate tests.

2. Nonactivation suspension tests

The results of these tests were negative.

3. Activation suspension tests

The results of these tests were negative.

B. Saccharomyces cerevisiae

1. Nonactivation suspension tests

The results of these tests were negative.

2. Activation suspension tests

The results of these tests were negative.

C. Conclusions

Compound PM9005463, did not exhibit genetic activity in any of the *in vitro* microbial tests employed in this evaluation.

Submitted by:

David Brusick, Ph.D.
Director of Genetics

APPENDIX

Tabulation of Data

Litton BIONETICS

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 431701 DETECTOR TA1535 SPECIES DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	0576	0007	1.22	2
	NAP		EMS 0.002 %	0390	4244	1088.21	0
PM9005463	NA1		0225-2 PCT.	0467	0014	3.00	0
PM9005463	NA2		0113-2 PCT.	0657	0005	0.76	0

Litton BIONETICS

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 431702 DETECTOR TA1537 SPECIES DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	0817	0035	4.28	0
	NAP		QM 1.0 UG/ML	0236	0981	415.68	0
PM9005463	NA1		0225-2 PCT.	0929	0032	3.44	0
PM9005463	NA2		0113-2 PCT.	0807	0039	4.83	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 431703 DETECTOR TA1538 SPECIES DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		DMSO	0337	0033	9.79	0
	NAP		NF 125 UG-ML	0341	0618	181.23	0
PM9005463	NA1		0225-2 PCT.	0386	0024	6.22	0
PM9005463	NA2		0113-2 PCT.	0558	0028	5.02	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 433801 DETECTOR 0000D4 SPECIES DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	NAN		SALINE	1303	0057	0062	4.37	4.76	0
	NAP		EMS 1.0 %	0643	1035	0389	160.96	60.50	0
PM9005463	NA1		0025-1 PCT.	1037	0030	0041	2.89	3.95	0
PM9005463	NA2		0125-2 PCT.	1089	0032	0033	2.94	3.03	0

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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 432301 DETECTOR TA1535 SPECIES ICRFLO DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0799	0021	2.63	0
	A-C		SALINE	0667	0007	1.05	0
	ACP	LI	DMN 50 UM/ML	0793	0463	58.39	0
	ACP	LU	DMN 50 UM/ML	0695	0008	1.15	2
	ACP	TE	DMN 50 UM/ML	0555	0053	9.55	2
PM9005463	ACT	LI1	0225-2 PCT.	0473	0014	2.96	2
PM9005463	ACT	LI2	0113-2 PCT.	0452	0015	3.32	2
PM9005463	ACT	LU1	0225-2 PCT.	0735	0009	1.22	2
PM9005463	ACT	LU2	0113-2 PCT.	0553	0011	1.99	2
PM9005463	ACT	TE1	0225-2 PCT.	0619	0010	1.62	2
PM9005463	ACT	TE2	0113-2 PCT.	0771	0018	2.33	2

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 432401 DETECTOR TA1537 SPECIES ICRFLO DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	1677	0062	3.70	0
	A-C		DMSO	1365	0047	3.44	0
	ACP	LI	AAF 800 UG/ML	1119	0163	14.57	0
	ACP	LU	AAF 800 UG/ML	1180	0039	3.31	2
	ACP	TE	AAF 800 UG/ML	1417	0053	3.74	2
PM9005463	ACT	LI1	0225-2 PCT.	1393	0032	2.30	2
PM9005463	ACT	LI2	0113-2 PCT.	1419	0028	1.97	2
PM9005463	ACT	LU1	0225-2 PCT.	1730	0035	2.02	0
PM9005463	ACT	LU2	0113-2 PCT.	1326	0043	3.24	0
PM9005463	ACT	TE1	0225-2 PCT.	1696	0069	4.07	2
PM9005463	ACT	TE2	0113-2 PCT.	1242	0042	3.38	2

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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 432501 DETECTOR TA1538 SPECIES ICRFLO DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0646	0032	4.95	0
	A-C		DMSO	0742	0019	2.56	0
	ACP	LI	AAF 800 UG/ML	0737	0269	36.50	2
	ACP	LU	AAF 800 UG/ML	0510	0022	4.31	0
	ACP	TE	AAF 800 UG/ML	0717	0024	3.35	2
PM9005463	ACT	LI1	0225-2 PCT.	0965	0028	2.90	2
PM9005463	ACT	LI2	0113-2 PCT.	0866	0040	4.62	2
PM9005463	ACT	LU1	0225-2 PCT.	0883	0025	2.83	2
PM9005463	ACT	LU2	0113-2 PCT.	0914	0028	3.06	2
PM9005463	ACT	TE1	0225-2 PCT.	0560	0021	3.75	2
PM9005463	ACT	TE2	0113-2 PCT.	0770	0032	4.16	2

Litton BIONETICS

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 433701 DETECTOR 0000D4 SPECIES ICRFLO DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0787	0028	0032	3.56	4.07	6
	A-C		SALINE	0837	0032	0052	3.82	6.21	0
	ACP	LI	DMN 90 UM/ML	0793	0058	0079	7.31	9.96	0
	ACP	LU	DMN 90 UM/ML	0781	0029	0030	3.71	3.84	0
	ACP	TE	DMN 90 UM/ML	0556	0017	0034	3.06	6.12	6
PM9005463	ACT	LI1	0025-1 PCT.	1036	0047	0058	4.54	5.60	1
PM9005463	ACT	LI2	0125-2 PCT.	0933	0043	0042	4.61	4.50	0
PM9005463	ACT	LU1	0025-1 PCT.	1010	0053	0044	5.25	4.36	0
PM9005463	ACT	LU2	0125-2 PCT.	1034	0057	0040	5.51	3.87	0
PM9005463	ACT	TE1	0025-1 PCT.	0830	0042	0040	5.06	4.82	0
PM9005463	ACT	TE2	0125-2 PCT.	0713	0040	0036	5.61	5.05	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 431801 DETECTOR TA1535 SPECIES SPRDAW DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0513	0016	3.12	0
	A-C		SALINE	0470	0020	4.26	0
	ACP	LI	DMN 50 UM/ML	0422	0207	49.05	0
	ACP	LU	DMN 50 UM/ML	0370	0010	2.70	0
	ACP	TE	DMN 50 UM/ML	0227	0008	3.52	0
PM9005463	ACT	LI1	0225-2 PCT.	0539	0016	2.97	2
PM9005463	ACT	LI2	0113-2 PCT.	0444	0026	5.86	2
PM9005463	ACT	LU1	0225-2 PCT.	0395	0014	3.54	0
PM9005463	ACT	LU2	0113-2 PCT.	0517	0008	1.55	2
PM9005463	ACT	TE1	0225-2 PCT.	0513	0012	2.34	0
PM9005463	ACT	TE2	0113-2 PCT.	0409	0011	2.69	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 431901 DETECTOR TA1537 SPECIES SPRDAW DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0600	0065	10.83	0
	A-C		DMSO	0840	0070	8.33	0
	ACP	LI	AAF 800 UG/ML	0998	0181	18.14	0
	ACP	LU	AAF 800 UG/ML	1169	0063	5.39	0
	ACP	TE	AAF 800 UG/ML	0735	0092	12.52	0
PM9005463	ACT	LI1	0225-2 PCT.	0896	0090	10.04	0
PM9005463	ACT	LI2	0113-2 PCT.	1070	0107	10.00	0
PM9005463	ACT	LU1	0225-2 PCT.	0808	0058	7.18	0
PM9005463	ACT	LU2	0113-2 PCT.	0865	0072	8.32	0
PM9005463	ACT	TE1	0225-2 PCT.	0756	0058	7.67	0
PM9005463	ACT	TE2	0113-2 PCT.	0988	0067	6.78	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 432201 DETECTOR TA1538 SPECIES SPRDAW DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0371	0040	10.78	0
	A-C		DMSO	0443	0025	5.64	0
	ACP	LI	AAF 800 UG/ML	0228	0296	129.82	0
	ACP	LU	AAF 800 UG/ML	0312	0048	15.38	0
	ACP	TE	AAF 800 UG/ML	0298	0018	6.04	0
PM9005463	ACT	LI1	0225-2 PCT.	0348	0038	10.92	0
PM9005463	ACT	LI2	0113-2 PCT.	0369	0021	5.69	0
PM9005463	ACT	LU1	0225-2 PCT.	0387	0027	6.98	2
PM9005463	ACT	LU2	0113-2 PCT.	0336	0014	4.17	0
PM9005463	ACT	TE1	0225-2 PCT.	0358	0021	5.87	0
PM9005463	ACT	TE2	0113-2 PCT.	0414	0018	4.35	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 434301 DETECTOR 0000D4 SPECIES SPRDAW DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0854	0023	0019	2.69	2.22	0
	A-C		SALINE	1135	0053	0034	4.67	3.00	0
	ACP	LI	DMN 90 UM/ML	0848	0055	0036	6.49	4.25	0
	ACP	LU	DMN 90 UM/ML	0821	0037	0035	4.51	4.26	0
	ACP	TE	DMN 90 UM/ML	0860	0025	0035	2.91	4.07	0
PM9005463	ACT	LI1	0025-1 PCT.	1055	0039	0059	3.70	5.59	0
PM9005463	ACT	LI2	0125-2 PCT.	1225	0046	0048	3.76	3.92	4
PM9005463	ACT	LU1	0025-1 PCT.	0829	0040	0039	4.83	4.70	4
PM9005463	ACT	LU2	0125-2 PCT.	1170	0048	0052	4.10	4.44	0
PM9005463	ACT	TE1	0025-1 PCT.	0926	0052	0018	5.62	1.94	6
PM9005463	ACT	TE2	0125-2 PCT.	1261	0032	0036	2.54	2.85	1

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 432604 DETECTOR TA1535 SPECIES RHESUS DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0392	0021	5.36	0
	A-C		SALINE	0338	0028	8.28	0
	ACP	LI	DMN 50 UM/ML	0337	0666	197.63	0
	ACP	LU	DMN 50 UM/ML	0211	0032	15.17	0
	ACP	TE	DMN 50 UM/ML	0298	0015	5.03	0
PM9005463	ACT	LI1	0225-2 PCT.	0451	0018	3.99	0
PM9005463	ACT	LI2	0113-2 PCT.	0463	0032	6.91	2
PM9005463	ACT	LU1	0225-2 PCT.	0308	0007	2.27	0
PM9005463	ACT	LU2	0113-2 PCT.	0421	0024	5.70	0
PM9005463	ACT	TE1	0225-2 PCT.	0355	0012	3.38	0
PM9005463	ACT	TE2	0113-2 PCT.	0191	0016	8.38	2

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 433101 DETECTOR TA1537 SPECIES RHESUS DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0794	0040	5.04	0
	A-C		DMSO	1135	0037	3.26	0
	ACP	LI	AAF 800 UG/ML	1122	0162	14.44	0
	ACP	LU	AAF 800 UG/ML	0848	0025	2.95	0
	ACP	TE	AAF 800 UG/ML	0874	0046	5.26	0
PM9005463	ACT	LI1	0225-2 PCT.	0771	0035	4.54	0
PM9005463	ACT	LI2	0113-2 PCT.	0959	0027	2.82	0
PM9005463	ACT	LU1	0225-2 PCT.	1051	0034	3.24	0
PM9005463	ACT	LU2	0113-2 PCT.	0854	0027	3.16	0
PM9005463	ACT	TE1	0225-2 PCT.	0642	0059	9.19	0
PM9005463	ACT	TE2	0113-2 PCT.	0915	0032	3.50	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 433601 DETECTOR TA1538 SPECIES RHESUS DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0152	0023	15.13	0
	A-C		DMSO	0187	0009	4.81	0
	ACP	LI	AAF 800 UG/ML	0279	0138	49.46	0
	ACP	LU	AAF 800 UG/ML	0261	0012	4.60	1
	ACP	TE	AAF 800 UG/ML	0246	0014	5.69	0
PM9005463	ACT	LI1	0225-2 PCT.	0190	0018	9.47	2
PM9005463	ACT	LI2	0113-2 PCT.	0237	0012	5.06	0
PM9005463	ACT	LU1	0225-2 PCT.	0275	0006	2.18	0
PM9005463	ACT	LU2	0113-2 PCT.	0289	0007	2.42	0
PM9005463	ACT	TE1	0225-2 PCT.	0419	0011	2.63	0
PM9005463	ACT	TE2	0113-2 PCT.	0262	0008	3.05	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 434401 DETECTOR 0000D4 SPECIES RHESUS DATE - 04/25/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0912	0051	0045	5.59	4.93	4
	A-C		SALINE	0960	0051	0059	5.31	6.15	4
	ACP	LI	DMN 90 UM/ML	0815	0048	.0051	5.89	6.26	4
	ACP	LU	DMN 90 UM/ML	0879	0033	0046	3.75	5.23	4
	ACP	TE	DMN 90 UM/ML	0888	0043	0031	4.84	3.49	4
PM9005463	ACT	LI1	0025-1 PCT.	0980	0035	0067	3.57	6.84	4
PM9005463	ACT	LI2	0125-2 PCT.	0882	0012	0027	1.36	3.06	6
PM9005463	ACT	LU1	0025-1 PCT.	1126	0041	0050	3.64	4.44	4
PM9005463	ACT	LU2	0125-2 PCT.	0825	0018	0053	2.18	6.42	6
PM9005463	ACT	TE1	0025-1 PCT.	0957	0024	0023	2.51	2.40	6
PM9005463	ACT	TE2	0125-2 PCT.	1092	0028	0013	2.56	1.19	2